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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,350	09/05/2003	Mark Schaepkens	136086-1	7026
6147	7590	09/20/2006	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			STOUFFER, KELLY M	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/655,350

Applicant(s)

SCHAEPKENS ET AL.

Examiner

Kelly Stouffer

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 19-30 and 41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7,10-18,31,32,36 and 40 is/are rejected.
- 7) ☒ Claim(s) 3-6,8,9,33-35 and 37-39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/5/03 and 4/4/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 19-30 and 41 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 29 August 2006.

Applicant's election without traverse of claims 1-18 and 31-40 in the reply filed on 29 August 2006 is acknowledged.

Response to Arguments

2. In the response filed on 29 August 2006, the applicant responded to an election of species requirement that was allegedly contained in the Office Action of 29 June 2006. After reviewing this Office Action, the Examiner did not find any requirement to elect a single disclosed species within the Office Action. Therefore, the election of species by the applicant is disregarded.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: article 160 in paragraph 0025 line 1 of the disclosure. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of

an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.

The abstract of the disclosure is objected to because the abstract exceeds 150 words, comprises on lines 1 and 10 should be —comprising—, and the abstract is comprised of two run-on sentences that are difficult to understand. Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities:

Reference characters 150 in Figure 1 and 134 in Figure 2 are not defined in the specification.

The main effects plots on page 19 should not be included in the specification, but in the drawings. See 37 CFR 1.58.

It is suggested by the examiner that the tables appearing on pages 12-19 conform to a single format.

Replaceable cascade plates are designated by both reference character 130 in paragraph 0025 line 7 and reference characters 122, 22 in paragraph 0032 line 4.

Reference character 130 is used to designate both replaceable cascade plates in paragraph 0025 line 7 and cylindrical orifice in paragraph 0035 line 1.

Appropriate correction is required.

Claim Objections

6. Claim 14 is objected to because of the following informalities: Claim 14 further limits claim 13, not claim 1 as it is written. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

Art Unit: 1762

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-2, 7, 10-12, 31 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent number 5846330 to Quirk et al. Quirk et al. includes a method of depositing a layer on a substrate with what can be considered an expanding thermal plasma generator (column 1 lines 36-55, shown in Figures 1 and 4) for plasma enhanced chemical vapor deposition (entire document) for depositing a coating on a substrate (column 1 lines 22-35). The generator shown in Figure 4 is made up of a cathode 56, anode 58, and modular gas injection disc 100 (considered a cascade plate at least as broadly recited in the claims) with an axial bore 120, or a concentric orifice. The insert 104 of the modular gas injection disc 100 is replaceable as described in the abstract and in column 6 lines 1-10. Quirk et al. does not explicitly state that changing the insert of the modular gas injection disc will effect target process conditions, however, one of ordinary skill in the art would recognize that changing the insert for cleaning or exchanging the insert for one with different properties would effect target process variables such as plasma gas flow, arc-pressure, ionization voltage, resistivity, pressure and deposition rate that would be effected by the diameter of the exit orifice for the plasma from the generator, since the diameter of the orifice would be changed from a worn orifice or a different sized orifice.

One of ordinary skill in the art would also recognize that since the process of Quirk et al. requires plasma flowing through the insert, after the insert was changed

Art Unit: 1762

plasma would then flow through the insert at the target process condition created by changing the insert. The plasma is generated by Quirk et al. in an arc between the anode and the cathode within the generator (column 1 lines 36-47) and is described in more detail with reference to prior art in columns 1 and 2 et seq. One of ordinary skill in the art would realize that a CVD chamber is characteristically under vacuum and would be of larger size than the plasma generator, and therefore when the gas as plasma enters a larger area, it will expand onto a substrate in the CVD chamber.

Regarding claim 7, Quirk et al. injects a reactant gas into the plasma within the generator in column 4 lines 32-44.

Regarding claims 10-12, Quirk et al. teaches that the size of the bores in the injection disk or insert (or as referred to by the applicant, orifice size in the plate) are dependant upon the experimental version used (column 6 lines 1-10) and are application dependant (column 5 lines 7-24). The variable of orifice size in the plate is therefore modified by routine experimentation and is a result-effective variable.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. by routine experimentation to include the orifice size of another plate or insert to be in the ranges of 1-20, 1.5-10, or 2-8 mm as required by the applicant to cater to different experimental applications absent evidence showing a criticality for the claimed ranges.

Quirk et al. includes all the limitations (including changing orifice geometry or shape in column 6 lines 5-6) of claim 40 except a power source coupled to the cathode. One of ordinary skill in the art would recognize that for a plasma to be generated in

Art Unit: 1762

between the anode and the cathode, both the anode and the cathode must have a power source coupled to it in order to gain the power used to generate the plasma.

8. Claims 13-18, 32, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quirk et al. in view of US Patent number 6426125 to Yang et al.

Regarding claims 13 and 14, Quirk et al. is described above and includes generating plasma in a generator that includes an anode, cathode, and what can be considered a removable concentric plate, to deposit a film on a substrate. Quirk et al. does not include the substrate as a thermoplastic or polycarbonate. Yang et al. teaches the substrate as thermoplastic or polycarbonate in column 1 et seq. and in column 5 lines 3-4 and 40 in order to coat commercially available materials that are useful in a variety of applications (column 1 lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include the substrate as thermoplastic or polycarbonate as taught by Yang et al. in order to coat commercially available materials that are useful in a variety of applications.

Regarding claim 15, Quirk et al. includes the requirements of claim 15 except using argon as an ionizable gas in plasma. Yang et al. teaches the use of argon as an ionizable gas in a plasma in column 3 line 44-48 which is recognized by the examiner as being well known in the art to use argon in a plasma.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include argon as an ionizable gas in a plasma as taught by Yang et al. as it is also well known in the art to use Argon with plasma.

Art Unit: 1762

Regarding claim 16, Quirk et al. includes the requirements of claim 16 except using plasma to generate successive coatings on a substrate. Yang et al. teaches the plasma to generate successive coatings on the substrate in order to produce articles with high UV absorbance and abrasion resistance. (column 2 lines 10-50)

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include a using plasma to generate successive coatings on a substrate as taught by Yang et al. in order to produce articles with high UV absorbance and abrasion resistance

Regarding claims 17 and 18, Quirk et al. includes the requirements of claims 17 and 18 except explicitly describing the substrate as flat or curved. Yang et al. teaches a substrate with any shape such as curved or flat in column 6 lines 14-22 to show the versatility of the coating method and many applications as suggested by Yang et al. in column 1.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include a using a substrate with any shape such as curved or flat as taught by Yang et al. in order to show the versatility of the coating method and many applications.

Regarding claim 32, Quirk et al. does not explicitly state that the deposition chamber after the plasma generator is at a lower pressure than the plasma generator. Yang et al. teaches the deposition chamber to be at a lower pressure than the plasma generator in order to produce a plasma jet with a high flow velocity (column 3 lines 19-39).

Art Unit: 1762

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include the deposition chamber pressure as lower than the plasma generator as taught by Yang et al. in order to produce a plasma jet with a high flow velocity.

Quirk et al. includes all of the limitations of claim 36 except for determining a desired layer characteristic and using the orifice configuration to provide a desired layer thickness. Yang et al. teaches desired layer thicknesses that depend upon deposition rate (see examples) that would be recognized by one of ordinary skill in the art as effected by orifice size. Layer thickness is important to provide a product that is commercially viable as a UV and scratch resistant article (column 1 et seq. and specifically lines 58-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Quirk et al. to include determining a desired layer characteristic and using the orifice configuration to provide a desired layer thickness as taught by Yang et al. in order to provide a product that is commercially viable as a UV and scratch resistant article.

Allowable Subject Matter

9. Claims 3-6, 9-8, 33-35, and 37-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Quirk et al. or Yang et al. do not include determining a target pressure, ionization voltage, or resistivity of the plasma. They also do not teach determining a desired gas

Art Unit: 1762

pressure or gas flow rate or an orifice with a certain straight wall length. These references, alone or in combination do not meet the limitations of claims 3-6, 9-8, 33-35, and 37-39.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bogachek and Lopes Cardozo et al. show a similar apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/655,350
Art Unit: 1762

Page 11

Kelly Stouffer
Examiner
Art Unit 1762

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A handwritten signature in black ink, appearing to read 'Timothy Weeks', with a stylized flourish at the end.

TIMOTHY WEEKS
SUPERVISOR/PALENT EXAMINER